

What is claimed is:

1. In a system including at least one line operably coupled to a telephony device and a plurality of trunks operably coupled to diverse networks, a method of routing voice calls over the diverse networks comprising:

in response to an off-hook detect signal generated during initiation of an outgoing voice call by a telephony device operably coupled to a particular line, electrically connecting said particular line to at least two trunks;

simultaneously routing over said at least two trunks at least one Dual Tone Multi-Frequency (DTMF) digit tone generated in accordance with operations of the telephony device operably coupled to the particular line;

detecting and analyzing at least one DTMF digit tone generated in accordance with operations of the telephony device operably coupled to the particular line to determine a classification tag for the outgoing voice call; and

disconnecting said particular line from at least one trunk based upon said classification tag to enable the outgoing voice call to proceed over another one of said at least two trunks.

2. A method according to claim 1, wherein:

said at least two trunks are identified by accessing at least one table that provides an ordered list of trunk assignments associated with the particular line.

3. A method according to claim 2, wherein:

said at least one table comprises a first table that stores trunk assignments for a first call-type and a second table that stores trunk assignments for a second call-type.

4. A method according to claim 3, wherein:

said first call-type represents a local call type associated with at least one of local calls, toll-free calls and emergency calls, and said second call-type represents a long distance call type associated with at least one of long distance calls, international calls and site-to-site calls.

5. A method according to claim 4, wherein:

said diverse networks include a Public Switched Telephone Network (PSTN)-based network and an Internet-based Voice over IP (VOIP) network, said first table stores trunk assignments that preferentially assign PSTN trunks to local calls, and said second table stores trunk assignments that preferentially assign VOIP trunks to long distance calls.

6. A method according to claim 1, further comprising:

in response to a ring signal generated during initiation of an incoming voice call over a particular trunk, electrically connecting said particular trunk to at least one line operably coupled to a telephone device.

7. A method according to claim 6, wherein:

said at least one line is identified by accessing at least one table that provides an ordered list of line assignments associated with the particular trunk.

8. A method according to claim 6, wherein

said particular trunk is electrically connected to a plurality of lines, wherein said plurality of lines are identified by accessing at least one table that provides an ordered list of line assignments associated with the particular trunk.

9. A method according to claim 6, further comprising:

providing a data structure that provides a list of line assignments associated with caller ID information;

detecting caller identification (ID) information associated with said incoming voice call; and

accessing said data structure with said caller ID information to identify said at least one line that is connected to the particular trunk.

10. A method according to claim 6, further comprising:

communicating said caller ID information to a network device over a network link therebetween.

11. A method according to claim 6, further comprising:

electrically connecting said particular trunk to answering machine functionality in parallel with the electrical connection to said at least one line.

12. A method according to claim 1, wherein:

connection of said line to said plurality of trunks is accomplished by a switching matrix.

13. A method according to claim 1, wherein:

said line is realized by time slots on one multi-channel trunk, said plurality of trunks are realized by time slots on at least one other multi-channel trunk, and connection of said line to said plurality of trunks is accomplished by space and time shifting of digital data over the time slots of the one multi-channel trunk and the time slots of the at least one other multi-channel trunk.

14. In a system including a plurality of lines operably coupled to telephony devices and a plurality of trunks operably coupled to diverse networks, an apparatus for routing voice calls over the diverse networks comprising:

switching means that selectively connects a subset of said lines to a subset of said trunks;

off-hook detection circuitry that detects an off-hook condition during initiation of an outgoing voice call by a telephony device operably coupled to a particular line;

switch control means, coupled to said off-hook detection circuitry, that controls said switch matrix to connect said particular line to at least two trunks in response to an off-hook detect control signal provided thereto by said off-hook detection circuitry and simultaneously route over said at least two trunks at least one Dual Tone Multi-

Frequency (DTMF) digit tone generated in accordance with operations by the telephony device operably coupled to the particular line;

DTMF detection circuitry, operably coupled to said switch control means, that detects at least one DTMF digit tone generated in accordance with the telephony device operably coupled to the particular line and that supplies DTMF digit data to said switch control means;

wherein said switch control means includes means for analyzing said DTMF digit data to determine a classification tag for the outgoing voice call, and means for controlling said switch matrix to disconnect said particular line from at least one trunk based upon said classification tag to enable the outgoing voice call to proceed over another one of said at least two trunks.

15. An apparatus according to claim 14, wherein:

said switch control means maintains at least one table that provides an ordered list of trunk assignments associated with the particular line, and accesses said at least one table to identify said at least two trunks.

16. An apparatus according to claim 14, wherein:

said at least one table comprises a first table that stores trunk assignments for a first call-type and a second table that stores trunk assignments for a second call-type.

17. An apparatus according to claim 16, wherein:

said first call-type represents a local call type associated with at least one of local calls, toll-free calls and emergency calls, and said second call-type represents a long distance call type associated with at least one of long distance calls, international calls and site-to-site calls.

18. An apparatus according to claim 17, wherein:

said diverse networks include a Public Switched Telephone Network (PSTN)-based network and an Internet-based Voice over IP (VOIP) network, said first table stores trunk assignments that preferentially assign PSTN trunks to local calls, and said second table stores trunk assignments that preferentially assign VOIP trunks to long distance calls.

19. An apparatus according to claim 18, wherein:

said VOIP trunks are operably coupled to a VOIP gateway, and said PSTN trunks are operably coupled to the PSTN.

20. An apparatus according to claim 19, wherein:

said apparatus is integrated with VOIP gateway functionality in a common system housing.

21. An apparatus according to claim 14, further comprising:

ring detect circuitry, operably coupled to said switch control means, that detects a ring signal generated during initiation of an incoming voice call over a particular trunk, and supplies a ring detect control signal to said switch control means;

wherein said switch control means operates to electrically connect said particular trunk to at least one line in response to said ring detect signal.

22. An apparatus according to claim 21, wherein:

said switch control means maintains at least one table that provides an ordered list of line assignments associated with the particular trunk, and accesses said at least one table to identify the at least one line connected to the particular trunk.

23. An apparatus according to claim 22, wherein:

said switch control means electrically connects said particular trunk to a plurality of lines, wherein said plurality of lines are identified by accessing the at least one table that provides an ordered list of line assignments associated with the particular trunk.

24. An apparatus according to claim 21, further comprising:

caller identification (ID) detection circuitry, operably coupled to said switch control means, that detects caller ID information associated with said incoming voice call;

wherein said switch control means maintains a data structure that provides a list of line assignments associated with caller ID information, and accessing said data

structure with said caller ID information to identify said at least one line that is connected to the particular trunk.

25. An apparatus according to claim 24, further comprising:

means for communicating said caller ID information to a network device over a network link therebetween.

26. An apparatus according to claim 21, wherein:

said switch control means electrically connects said particular trunk to answering machine functionality in parallel with the electrical connection to said at least one line.

27. An apparatus according to claim 14, wherein:

said switch control means comprises a programmed microprocessor system.

28. An apparatus according to claim 14, wherein:

said switch control means maintains a call log of call information.

29. An apparatus according to claim 28, further comprising:

means for accessing said call log via user execution of a network-based utility.

30. An apparatus according to claim 14, further comprising:

means for manipulating configuration parameters of said apparatus via user execution of a network based utility.



31. An apparatus according to claim 12, wherein:

said switching means comprises a switch matrix.

32. An apparatus according to claim 31, wherein:

said switch matrix is adapted to electrically connect at least one line to a corresponding PSTN trunk in the event of power failure.

33. An apparatus according to claim 12, wherein:

said plurality of lines are realized by time slots on at least one multi-channel trunk, said plurality of trunks are realized by time slots on at least one other multi-channel trunk, and connection of said line to said plurality of trunks, and said switching means comprises switching logic that performs space and time shifting of digital data over the time slots of the multi-channel trunks.

34. A telephony system for a premises comprising:

a plurality of telephone devices located in said premises;

a plurality of lines operably coupled to telephony devices;

a plurality of trunks operably coupled to diverse networks; and

an apparatus for routing voice calls over the diverse networks including

switching means that selectively connects a subset of said lines to a subset of said trunks,

off-hook detection circuitry that detects an off-hook condition during initiation of an outgoing voice call by a telephony device operably coupled to a particular line,

switch control means, coupled to said off-hook detection circuitry, that controls said switch matrix to connect said particular line to at least two trunks in response to an off-hook detect control signal provided thereto by said off-hook detection circuitry and simultaneously route over said at least two trunks at least one Dual Tone Multi-Frequency (DTMF) digit tone generated in accordance with operations by the telephony device operably coupled to the particular line,

DTMF detection circuitry, operably coupled to said switch control means, that detects at least one DTMF digit tone generated in accordance with operations by the telephony device operably coupled to the particular line and that supplies DTMF digit data to said switch control means,

wherein said switch control means includes means for analyzing said DTMF digit data to determine a classification tag for the outgoing voice call, and means for controlling said switch matrix to disconnect said particular line from at least one trunk based upon said classification tag to enable the outgoing voice call to proceed over another one of said at least two trunks.

35. A system according to claim 34, wherein:

said switch control means maintains at least one table that provides an ordered list of trunk assignments associated with the particular line, and accesses said at least one table to identify said at least two trunks.

36. A system according to claim 35, wherein:

said at least one table comprises a first table that stores trunk assignments for a first call-type and a second table that stores trunk assignments for a second call-type.

37. A system according to claim 36, wherein:

said first call-type represents a local call type associated with at least one of local calls, toll-free calls and emergency calls, and said second call-type represents a long distance call type associated with at least one of long distance calls, international calls and site-to-site calls.

38. A system according to claim 37, wherein:

said diverse networks include a Public Switched Telephone Network (PSTN)-based network and an Internet-based Voice over IP (VOIP) network, said first table stores trunk assignments that preferentially assign PSTN trunks to local calls, and said second table stores trunk assignments that preferentially assign VOIP trunks to long distance calls.

39. A system according to claim 38, further comprising:

a VOIP gateway, located in said premises, that is operably coupled between said VOIP trunks and said VOIP network; and

a Network Interface Unit, located at said premises, that operably couples said PSTN trunks to said PSTN network.

40. A system according to claim 39, wherein:

said apparatus is integrated with VOIP gateway functionality in a common system housing.

41. A system according to claim 34, wherein:

said apparatus further comprises ring detect circuitry, operably coupled to said switch control means, that detects a ring signal generated during initiation of an incoming voice call over a particular trunk, and supplies a ring detect control signal to said switch control means;

wherein said switch control means operates, in response to said ring detect signal, to electrically connect said particular trunk to at least one line.

42. A system according to claim 41, wherein:

said switch control means maintains at least one table that provides an ordered list of line assignments associated with the particular trunk, and accesses said at least one table to identify the at least one line connected to the particular trunk.

43. A system according to claim 42, wherein:

said switch control means electrically connects said particular trunk to a plurality of lines, wherein said plurality of lines are identified by accessing the at least one table that provides an ordered list of line assignments associated with the particular trunk.

44. A system according to claim 41, wherein:

said apparatus further comprises caller identification (ID) detection circuitry, operably coupled to said switch control means, that detects caller ID information associated with said incoming voice call;

wherein said switch control means maintains a data structure that provides a list of line assignments associated with caller ID information, and accessing said data structure with said caller ID information to identify said at least one line that is connected to the particular trunk.

45. A system according to claim 44, further comprising:

means for communicating said caller ID information to a network device over a network link therebetween.

46. A system according to claim 41, wherein:

said switch control means electrically connects said particular trunk to answering machine functionality in parallel with the electrical connection to said at least one line.

47. A system according to claim 34, wherein:

said switch control means comprises a programmed microprocessor system.

48. A system according to claim 34, wherein:

said switch control means maintains a call log of call information.

49. A system according to claim 48, wherein:

said apparatus comprises means for accessing said call log via user execution of a network-based utility.

50. A system according to claim 34, further comprising:

means for manipulating configuration parameters of said apparatus via user execution of a network based utility.

51. A system according to claim 34, wherein:

said switching means comprises a switch matrix.

52. A system according to claim 51, wherein:

said switch matrix is adapted to electrically connect at least one line to a corresponding PSTN trunk in the event of power failure.

53. A system according to claim 34, wherein:

said plurality of lines are realized by time slots on at least one multi-channel trunk, said plurality of trunks are realized by time slots on at least one other multi-channel trunk, and connection of said line to said plurality of trunks, and said switching means comprises switching logic that performs space and time shifting of digital data over the time slots of the multi-channel trunks.